

WHAT IS CLAIMED IS:

1. A method of treating an acid treatment solution which includes at least one of nitric acid and hydrochloric acid for removing non-alkaline metal ions therefrom, the method comprising the steps of:

determining an amount of the non-alkaline metal ions in the acid treatment solution;

adding a sulfuric acid to the acid treatment solution in an amount based on the amount of the non-alkaline metal ions to produce sulfate of the non-alkaline metal;

recovering an acid treatment solution from which the sulfate is separated such that the sulfate is separated from the acid treatment solution to which the sulfuric acid has been added.

2. The method according to claim 1, wherein the step of recovering an acid treatment solution comprises the sub-step of performing electrodialysis using an ion-exchange membrane.

3. The method according to claim 2, wherein the ion-exchange membrane comprise at least one positive ion-exchange membrane and at least one negative ion-exchange membrane.

4. The method according to claim 1, wherein the non-alkaline metal is aluminum.

5. The method according to claim 4, wherein the acid treatment solution that is to be treated is an acid electrolysis that has been used for a process of electrolytically surface-roughening an aluminum plate in a method for fabricating a support of a planographic printing plate.

6. The method according to claim 1, wherein the step of recovering an acid treatment solution comprises the sub-steps of:

preparing an electrodialysis bath that contains at least an anode, cathode and at least one set of membranes which is located between the anode and the cathode, each set of membranes including negative and positive ion-exchange membranes, with the negative ion-exchange membrane of each set provided in the bath being disposed closer to the anode than the positive ion-exchange membrane of the set such that a first chamber is formed between the negative and positive ion-exchange membranes, and second chambers being formed at portions of the electrodialysis bath other than the first chamber of each set;

supplying the acid treatment solution to which the sulfuric acid has been added to the first chamber of each set;

supplying at least one liquid selected from a group consisting of

water, a dilute nitric acid, and a dilute hydrochloric acid to each of the second chambers;

performing electrodialysis by supplying electric current to the anode and the cathode; and

collecting the water or the acid treatment solution from which the sulfate is separated from each of the second chambers.

7. The method according to claim 6, further comprising the step of drawing a liquid which includes sulfate from the first chamber of each set.

8. The method according to claim 6, wherein the acid treatment solution from which the sulfate is separated is collected at a concentration greater than before the electrodialysis.

9. The method according to claim 6, wherein the at least one liquid selected from a group consisting of water, a dilute nitric acid, and a dilute hydrochloric acid is the acid treatment solution from which the sulfate is separated or water which are corrected in the correcting step.

10. A device for treating an acid treatment solution which includes at least one of nitric acid and hydrochloric acid, for removing non-alkaline metal ions therefrom, the device comprising:

a sulfuric acid addition component which adds sulfuric acid to the acid treatment solution in an amount based on an amount of the non-alkaline metal ions in the acid treatment solution to produce sulfate of non-alkaline metal; and

an acid treatment solution recovery component which separates the sulfate from the acid treatment solution to which the sulfuric acid has been added and recovers the acid treatment solution.

11. The device according to claim 10, wherein the electrodialysis bath comprises an anode, a cathode and at least one set of membranes which is located between the anode and cathode, each set of membranes including negative and positive ion-exchange membranes, with the negative ion-exchange membrane of each set provided in the bath being disposed closer to the anode than the positive ion-exchange membrane of the set such that a first chamber is formed between the negative and positive ion-exchange membranes, and second chambers being formed at portions of the electrodialysis bath other than the first chamber of each set.

12. The device according to claim 10, further comprising at least one of component which determine an amount of the non-alkaline metal ions and a component which determine a concentration of acid.

13. The device according to claim 11, further comprising a collection solution drawing conduit and a deacidified solution drawing conduit, one of the conduits being connected to the first chamber of each set and the other being connected to each of the second chambers.

14. The device according to claim 13, further comprising a collection solution supply conduit and a sulfuric acid added electrolyte transfer conduit for transferring the acid treatment solution to which the sulfuric acid has been added from the sulfuric acid addition component, one of the collection solution supply conduit and the sulfuric acid-supplemented solution transfer conduit being connected to the first chamber of each set and the other being connected to each of the second chambers.

15. The device according to claim 14, wherein the sulfuric acid added electrolyte transfer conduit and the deacidified solution drawing conduit are both connected to the first chamber of each set.

16. A method for fabricating a support for a planographic printing plate, the method comprising the steps of:

electrolytically surface-roughening an aluminum plate by an AC electrolysis thereon in an acid electrolyte that contains at least one of nitric acid and hydrochloric acid, in an AC electrolysis bath;

drawing at least a portion of the acid electrolyte in the AC electrolysis bath out of the AC electrolysis bath;

adding sulfuric acid to the acid electrolyte that has been drawn out of the AC electrolysis bath, in an amount based on an amount of aluminum ions in the acid electrolyte that has been drawn, so that aluminum sulfate is generated; and

recovering an acid electrolyte from the acid electrolyte to which the sulfuric acid has been added, by separating the aluminum sulfate; and

returning the recovered acid electrolyte to the AC electrolysis bath.

17. The method according to claim 16, wherein the step of recovering acid electrolyte comprises the sub-steps of:

preparing an electrodialysis bath that contains at least an anode, a cathode and at least one set of membranes, each set of membranes including negative and positive ion-exchange membranes, with the negative ion-exchange membrane of each set provided in the electrolysis bath being disposed closer to the anode than the positive ion-exchange membrane of the set such that a first chamber is formed between the negative and positive ion-exchange membranes, and second chambers being formed at portions of the electrodialysis bath other than the first chamber of each set;

supplying the acid electrolyte to which the sulfuric acid has been

added to the first chamber of each set;

supplying at least one liquid selected from a group consisting of water, a dilute nitric acid, and a dilute hydrochloric acid to each of the second chambers;

performing electrodialysis by supplying electric current to the anode and the cathode; and

collecting the acid treatment solution from which the sulfate is separated or water from each of the second chambers.

18. The method according to claim 17, further comprising the step of drawing solution which includes aluminum sulfate from the first chamber of each set.

19. The method according to claim 16, wherein an aluminum plate comprises a consecutive aluminum web.

20. The method according to claim 16, further comprising a step of reserving the recovered acid electrolyte in a collection solution reservoir, before the step of returning the recovered acid electrolyte to the AC electrolysis bath.